

HIGHLIGHTS OF THE JEF PROJECT ACTIVITIES(September 1986 - September 1987)M. SALVATORES1 - BENCHMARKING OF JEF-1

The extensive benchmarking activity performed by various laboratories on JEF-1 data, has continued during this year. The major results are related to thermal reactor core and fuel cycle data validation, neutron shielding, fast reactor core and fuel cycle data. In general, the quality of data has been found satisfactory. However, some specific points for further evaluation and evaluation revisions have been indicated. In particular, the thermal data for the major actinides, and the shape of U-235 and U-238 cross-sections in the thermal range. New experimental data (both from GEEL and HARWELL) are being used, to revise the current evaluations.

Pu-239 cross-sections (and, in particular, the fission cross-section) have been found to be not yet satisfactory, practically all over the energy range. On the contrary, some important fuel cycle related data (Am-241 fission and partly capture, Np-237(n,2n)), have been found to meet the present accuracy requirements, when used in the analysis of irradiated fuel experiments.

Fe data for shielding were found to need revision at high energy (inelastic scattering), to account for the trends indicated by neutron propagation experiments.

The fission product isotope benchmarking has progressed, also for isotopes of lesser importance for burn-up calculations.

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2 - NEW EVALUATIONS

Besides the thermal energy data of the major actinides (SACLAY), the Pu-239 and Pu-241 data are being reevaluated (CADARACHE in cooperation with ORNL).

The structural materials are also reevaluated : in particular, a new preliminary version of Cr (including photon production data) has been made available by ENEA-Bologna. Work is in progress for Fe (KfK), and Ni isotopes. In the field of fission product nuclei, the inelastic scattering of even-even nuclei is being theoretically investigated (ECN-Petten).

U-238 is also being reevaluated (UK-Harwell) as far as possible consistently with the new ENDF/B-VI standard (see below).

3 - STANDARDS AND DOSIMETRY

It has been thought that the adoption of the ENDF/B-VI standards would be an important point, in view of future exchanges and in view of the high quality work involved in these data.

Dosimetry data are currently being reviewed by ECN-Petten, to define a consistent dosimetry file.

4 - DECAY HEAT DATA

Decay and fission yield data files have been distributed for benchmarking. Tests are underway in the UK and FRANCE. The STODSVIK meeting and the benchmarking work, should give guidance to indicate appropriate areas which need efforts to improve the quality of the present file. Some collaborative work with the IAEA is planned.

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5 - COVARIANCE DATA

The JEF project is strongly advising the evaluators to provide covariance data with the new evaluations, even if in a simple form, although respecting the standard ENDF/B formats. A multigroup library of covariance data has been produced by the NEA Data Bank, for use in shielding applications.

6 - FORMATS AND PROCESSING

REICH-MOORE formalism and the File-6 format suggested by H. GRUPPELAAR, have been adopted. The NEA Data Bank has looked (up to now successfully) into the problems of format consistency (ENDF/B-V and VI).

The processing of the data to multigroup form is made essentially with the NJOY code, and with the THEMIS code (developped from NJOY in SACLAY), which are the JEF suggested routes of processing. In particular, many of the major algorithms of THEMIS (resonance range and self-shielding calculation, photon production, KERMA, inelastic scattering), are being tested and validated by various laboratories of the JEF community.

7 - TIME SCHEDULE

The deadline for the JEF-2 version is the end of 1988. It is conceivable that at that time the different parts of the file will be at different degrees of validation, and a policy of progressive distribution of the different parts (fission products, minor actinides, major isotopes) is being considered.

The validation and benchmarking work will start already in 1988, and will extend probably for one more year.

Cadarache, September 1987